



How might future transport technologies impact urban planning in New Zealand

Simon Kingham

Kaitohutohu Matua Pūtaiao | Chief Science Advisor - Te Manatū Waka | Ministry of Transport

Ahorangi | Professor - Te Whare Wānanga o Waitaha | University of Canterbury

Challenges

- Climate change
- Energy use
- Pollution
- Congestion
- Physical activity / Obesity
- Community severance
- Inequality

Transport Outcomes



Future 'things' that might solve or create challenges

Energy

- Fossil fuels
- Biofuels - fuels produced from renewable organic materials
 - Land use implications
- Green hydrogen

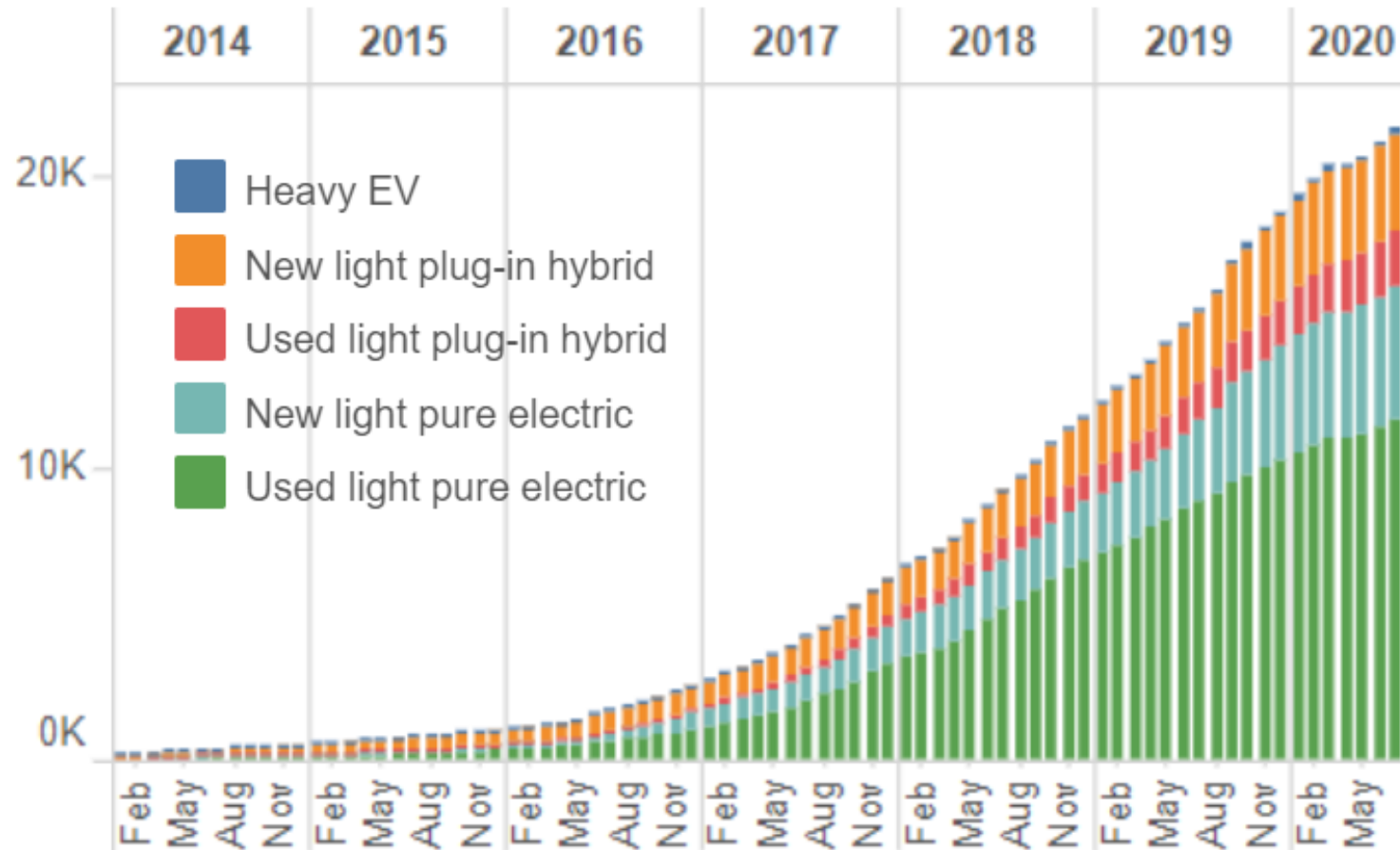
Green hydrogen for Tiwai? Govt acknowledges interest is out there

Mike Fallow · 16:18, Jul 13 2020

<https://www.stuff.co.nz/southland-times/news/122118467/green-hydrogen-for-tiwai-govt-acknowledges-interest-is-out-there>

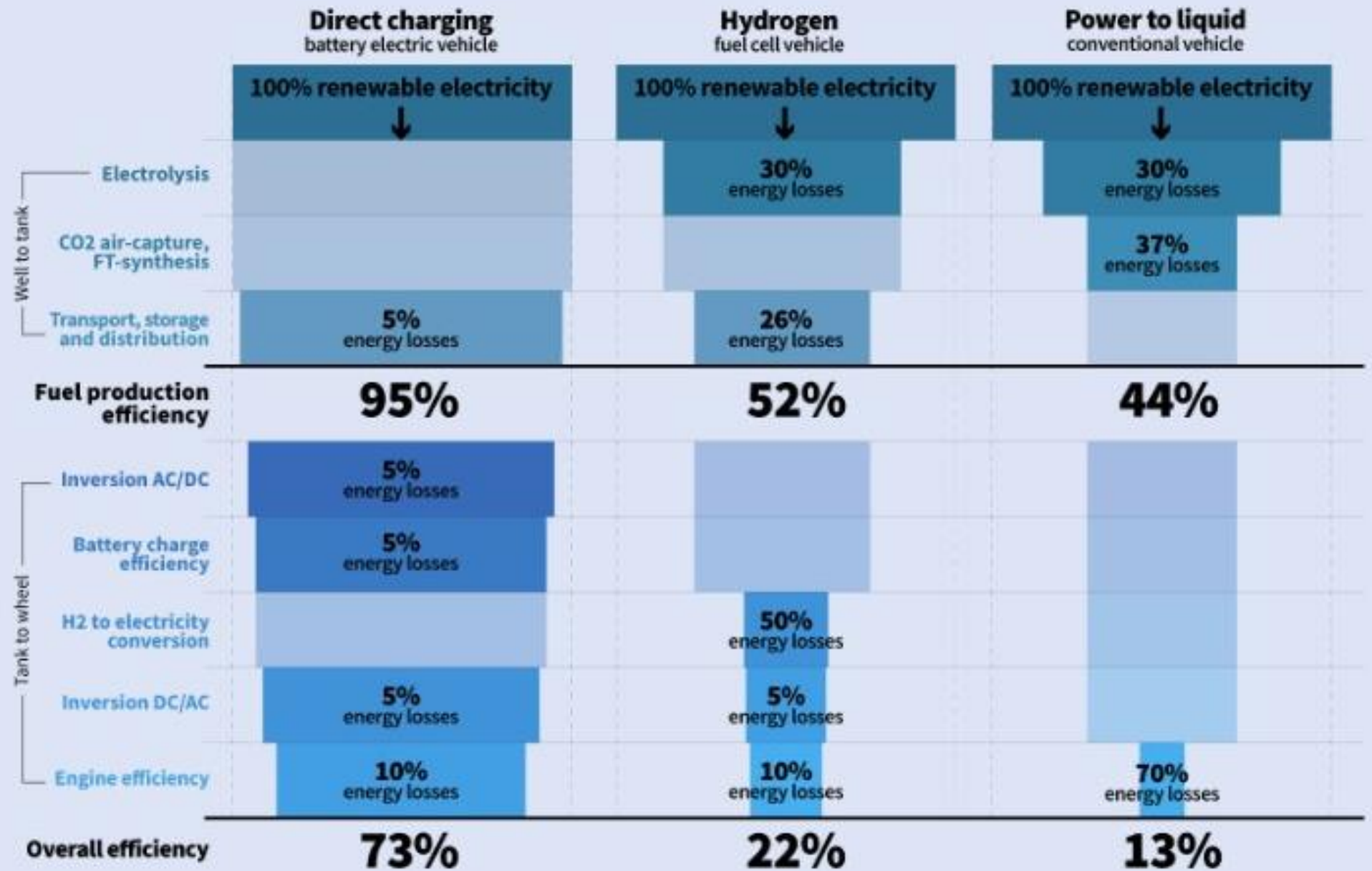
Electric

EV fleet size

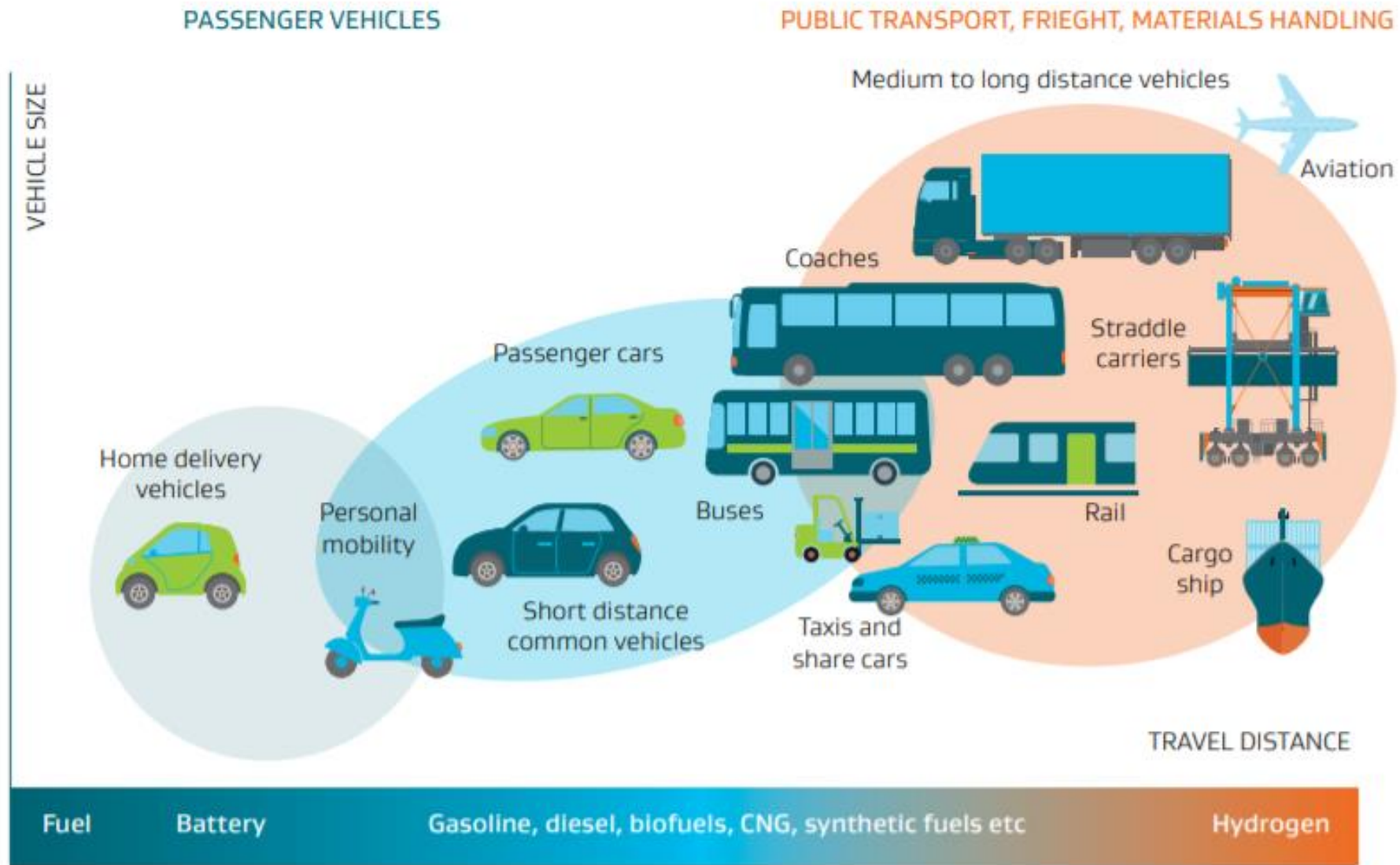


Total ⁽¹⁾⁽²⁾ registered vehicles by type	
As at 31 August 2020	
Vehicle Type	
Total	5,405,408
AGRICULTURAL MACHINE	2,733
ATV	7,744
BUS	32,135
GOODS VAN/TRUCK/UTILITY	782,347
HIGH SPEED AGRICULTURAL VEHICLE	144
MOBILE MACHINE	22,689
MOPED	31,468
MOTOR CARAVAN	47,025
MOTORCYCLE	161,864
PASSENGER CAR/VAN	3,473,008
SPECIAL PURPOSE VEHICLE	3,279
TRACTOR	45,840
TRAILER NOT DESIGNED FOR H/WAY USE	998
TRAILER/CARAVAN	794,134

<https://www.nzta.govt.nz/resources/new-zealand-motor-vehicle-register-statistics/national-vehicle-fleet-status/>

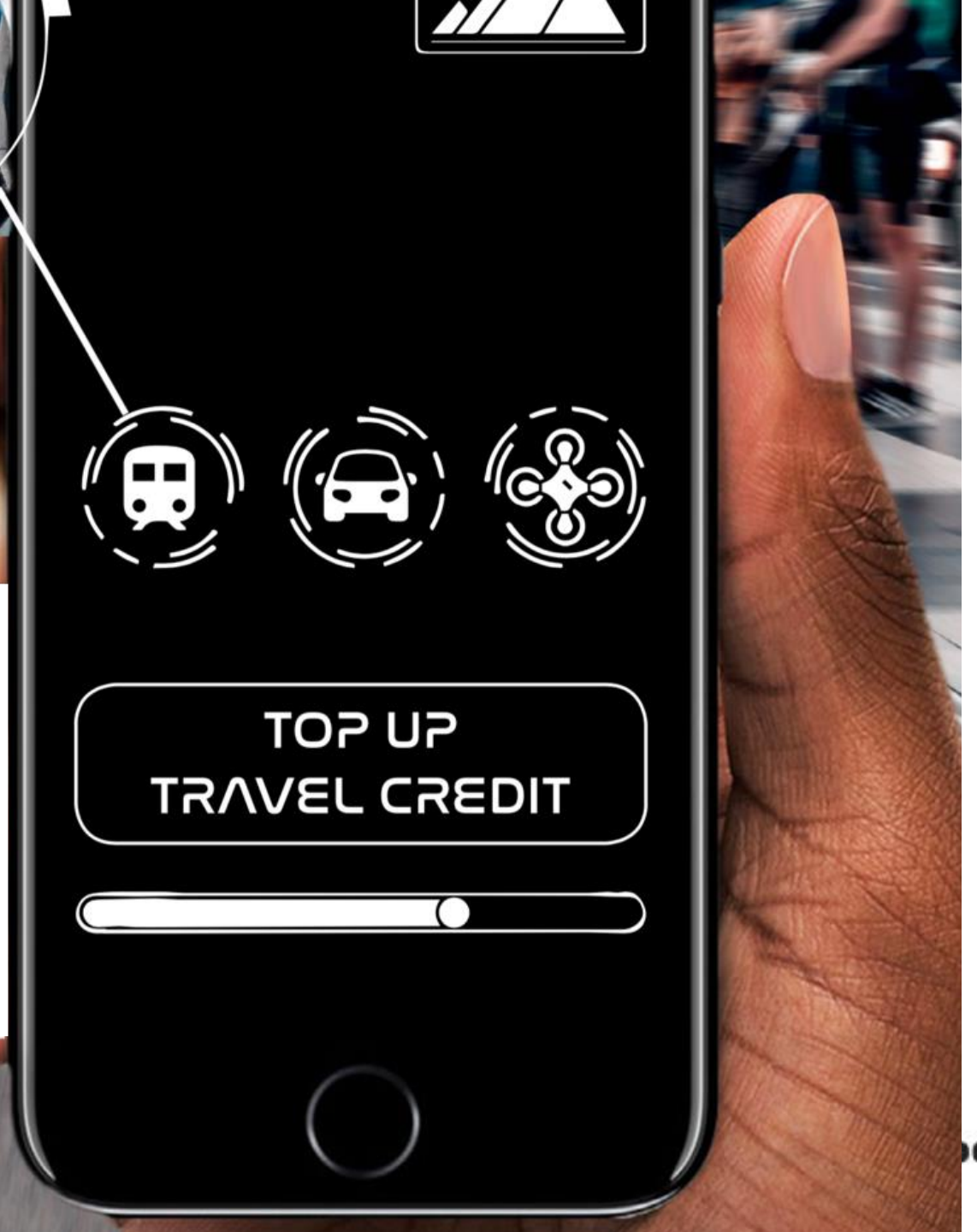


Fuel electric cell vehicles



<https://www.mbie.govt.nz/have-your-say/a-vision-for-hydrogen-in-new-zealand-public-consultation/>

Figure 16: Vehicles that can be powered by hydrogen or electricity (17)



Smartphones have become
travel planners

+ payment systems

Ride hailing and sharing services have become common



Smartphones

But

- Does everyone have access to them?
- Socio-economic issues?

Micromobility



Advantages of micromobility

- Reducing GHG Emissions and Improve air pollution
- Enhancing efficiency
 - 22 kgs vs 1300 kgs
- Save money
 - 1 % cost of fueling a car
- Open up public transport
 - First- and last-mile transport
- Fun!

Concerns of micromobility

NEW ZEALAND

Plans to allow bikes, e-bikes and e-scooters on footpaths opposed

17 Apr, 2020 1:51pm

🕒 4 min

https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12325605



Shared mobility

Shared mobility



Electric vehicles on-demand

Join the sharing revolution for a better tomorrow



ZERO EMISSIONS

Zilch cars are all 100% battery electric. There's no petrol or diesel used in Zilch cars



REDUCED CONGESTION

One shared car can replace 10 privately used vehicles, freeing our city streets



SAFER ROADS

All our cars are ANCAP 5-star rated, full of the latest safety technology



SHARE THE LOVE

Shared private & public use means anyone over 21yrs can drive Zilch cars



Shared mobility

- Vauban, Freiburg



Potential Impacts of Shared Mobility

- Newer vehicles
 - Less pollution (inc EVs)
 - Safer
- Decision for 'every' trip
 - More 'cheaper' greener trips
- Vehicles 'fit for purpose'
 - Small, light for single occupant trips
- Unequal?
 - But may *"increase inequality where premium levels of service are on offer to those who pay more"*

Mobility as a Service (MaaS)



Helsinki ▾ English ▾

Plans

Help

News

Download

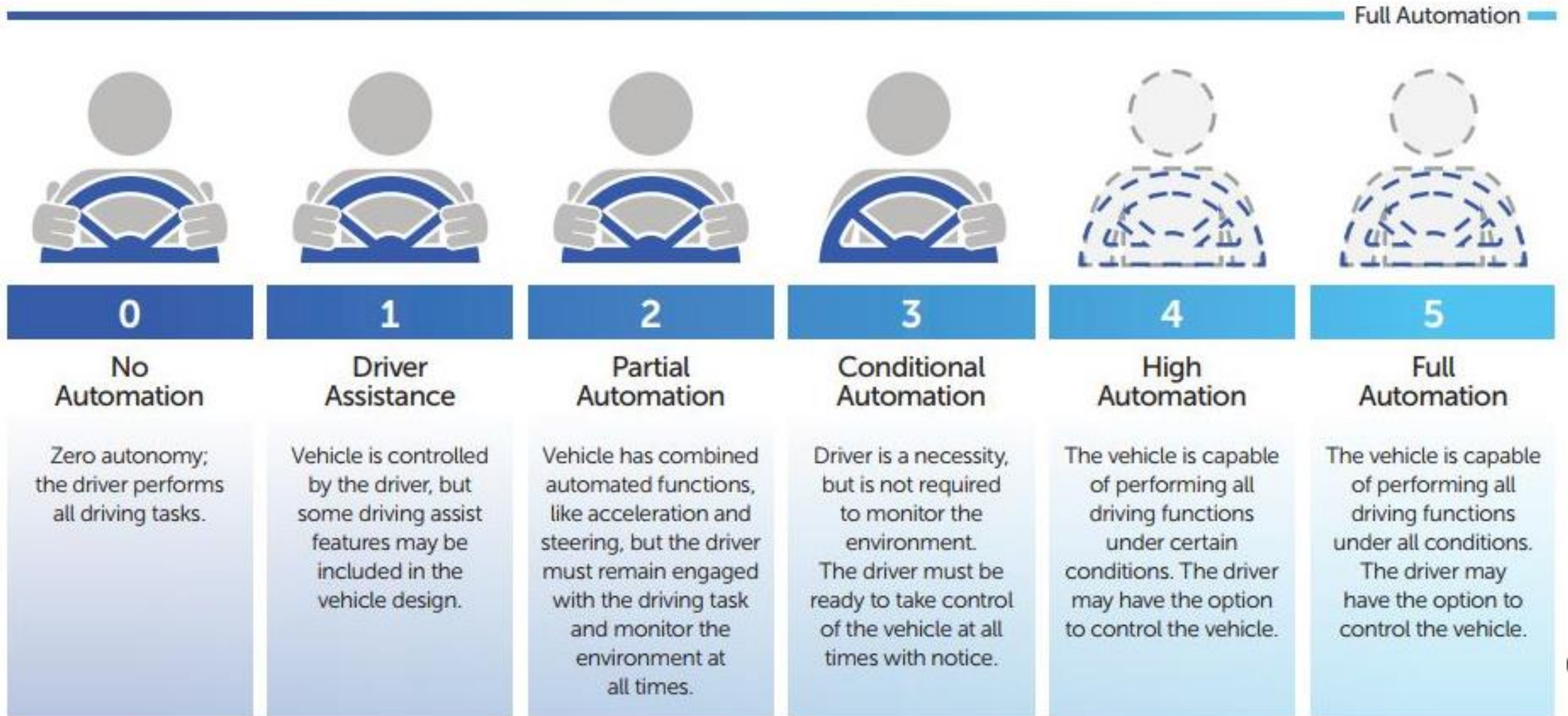
	Whim Urban 30 €59,7 / 30 days	Whim Weekend €249 / 30 days	Whim Unlimited €499 / month	Whim to Go Pay as you go
Public transport	HSL 30-day ticket	HSL 30-day ticket	Unlimited HSL single tickets	Pay as you go
City bikes	Included (max. 30 min per ride)	Included (max. 30 min per ride)	Included (max. 30 min per ride)	Whole season 24,90€
Taxis	4 x €10 (max. 5km rides), others normal price	-15%	80 rides (max 5 km), other rides normal price	Pay as you go
Rental car	€49/day	Weekends	Unlimited	Pay as you go
E-scooter	TIER Standard pricing	TIER Standard pricing	TIER Standard pricing	TIER Standard pricing
	Read more	Read more	Read more	Read more

1€ = NZ\$1.80

Autonomous vehicles

Autonomous vehicles

SAE AUTOMATION LEVELS



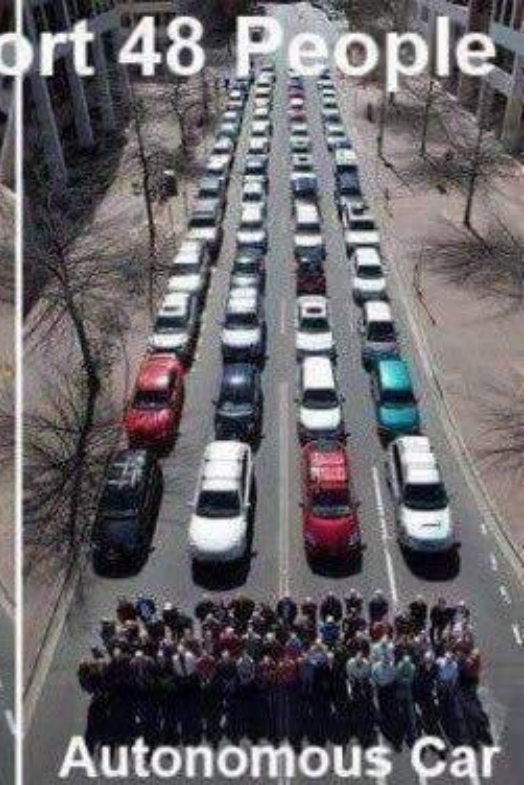


Fully autonomous vehicles

BENEFITS OF DRIVERLESS CARS



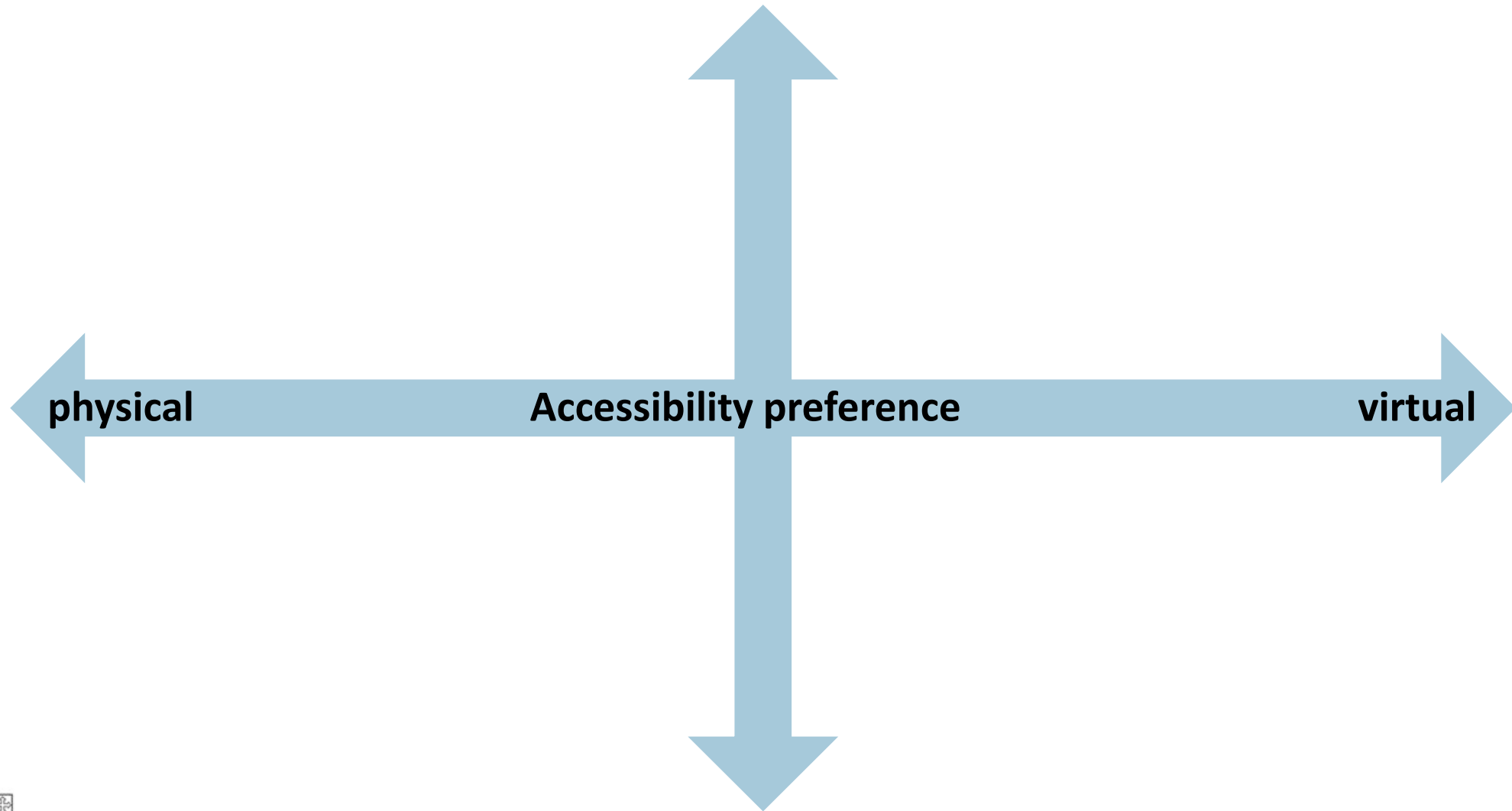
Space Required To Transport 48 People

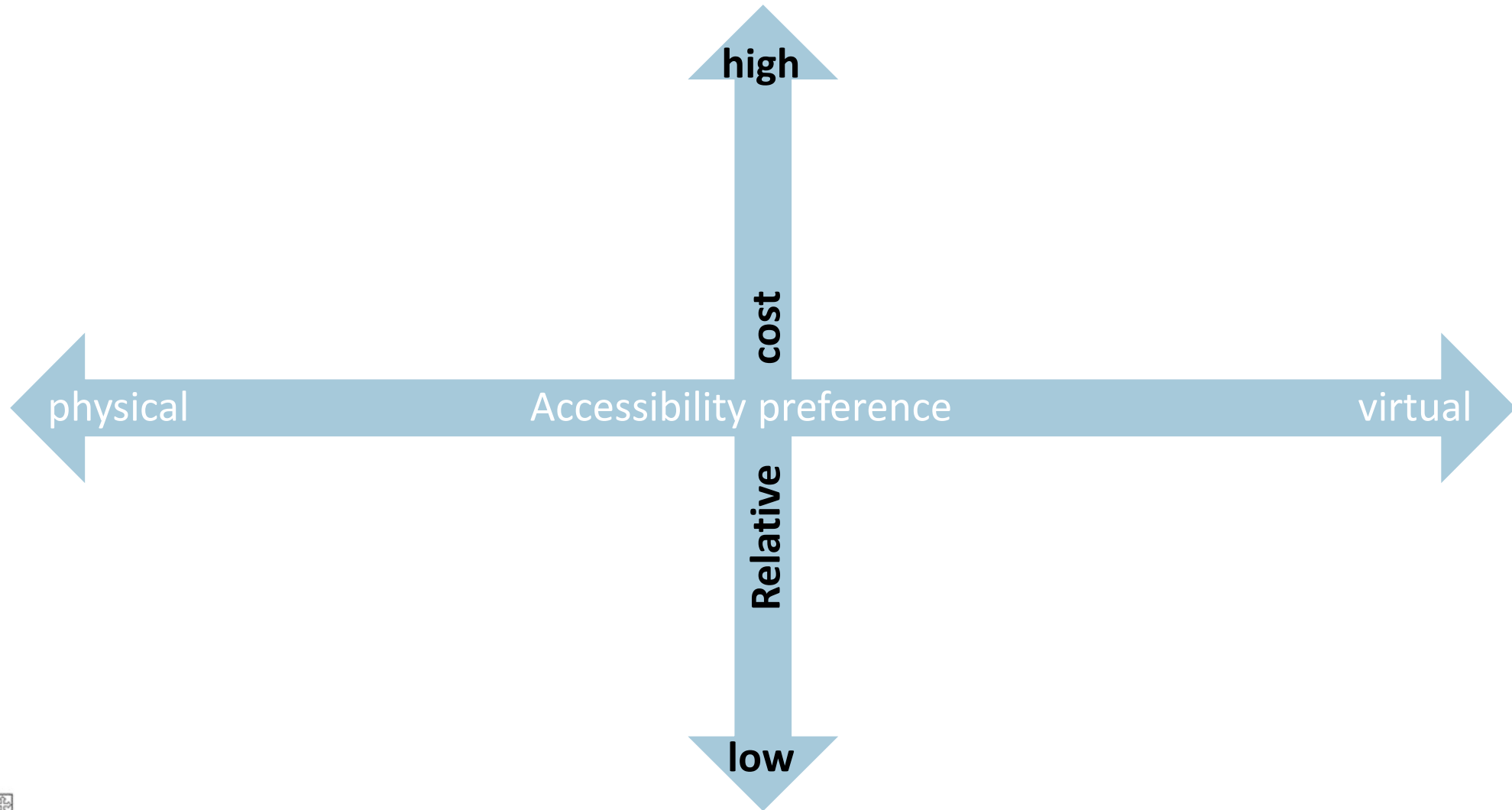


CPF
cycling promotion fund



Ministry of Transport
TE MANATŪ WAKA





Co-operative and Close

↓ 3%



high

cost

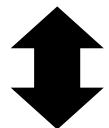
physical

Accessibility preference

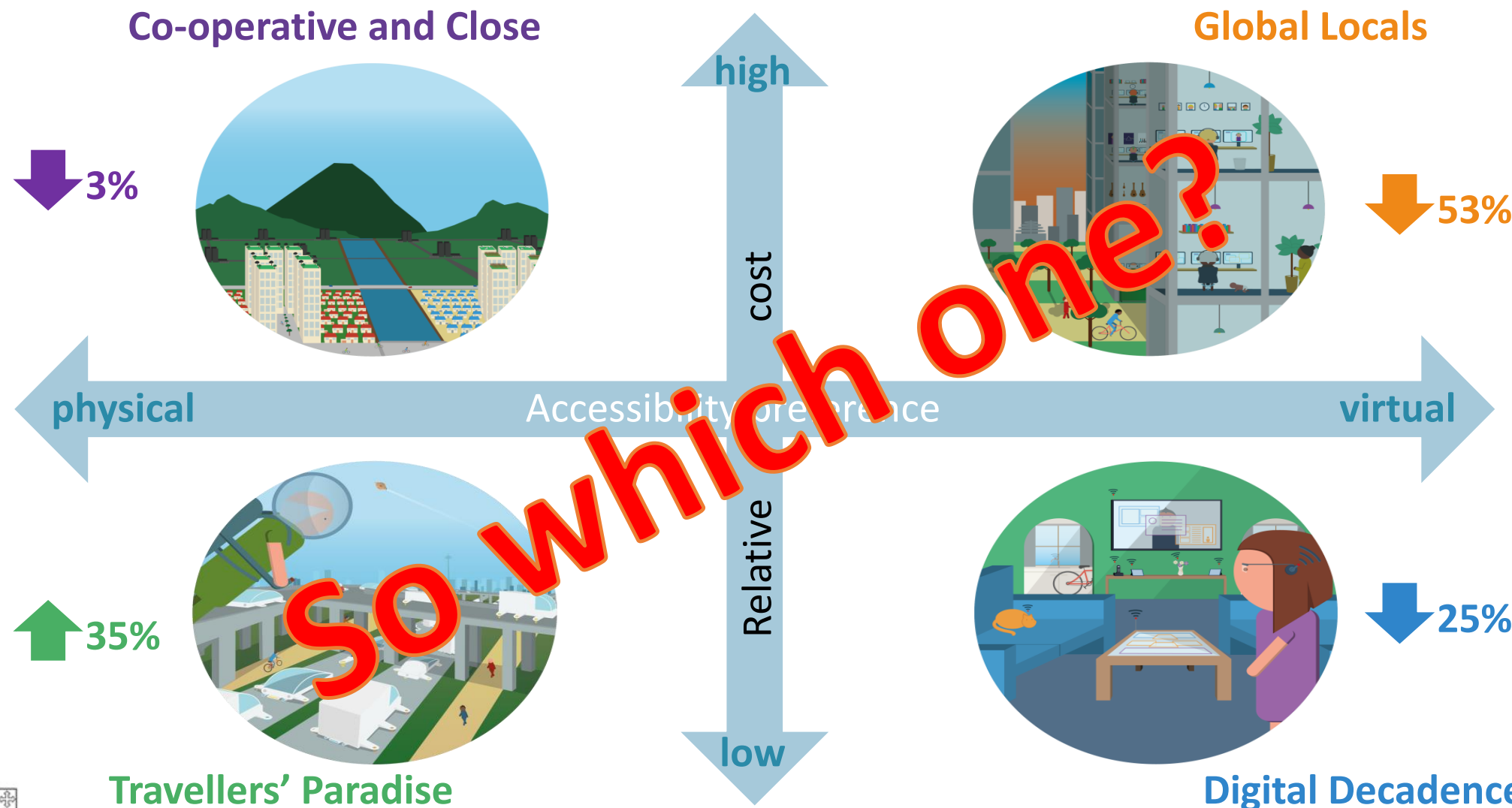
virtual

Relative

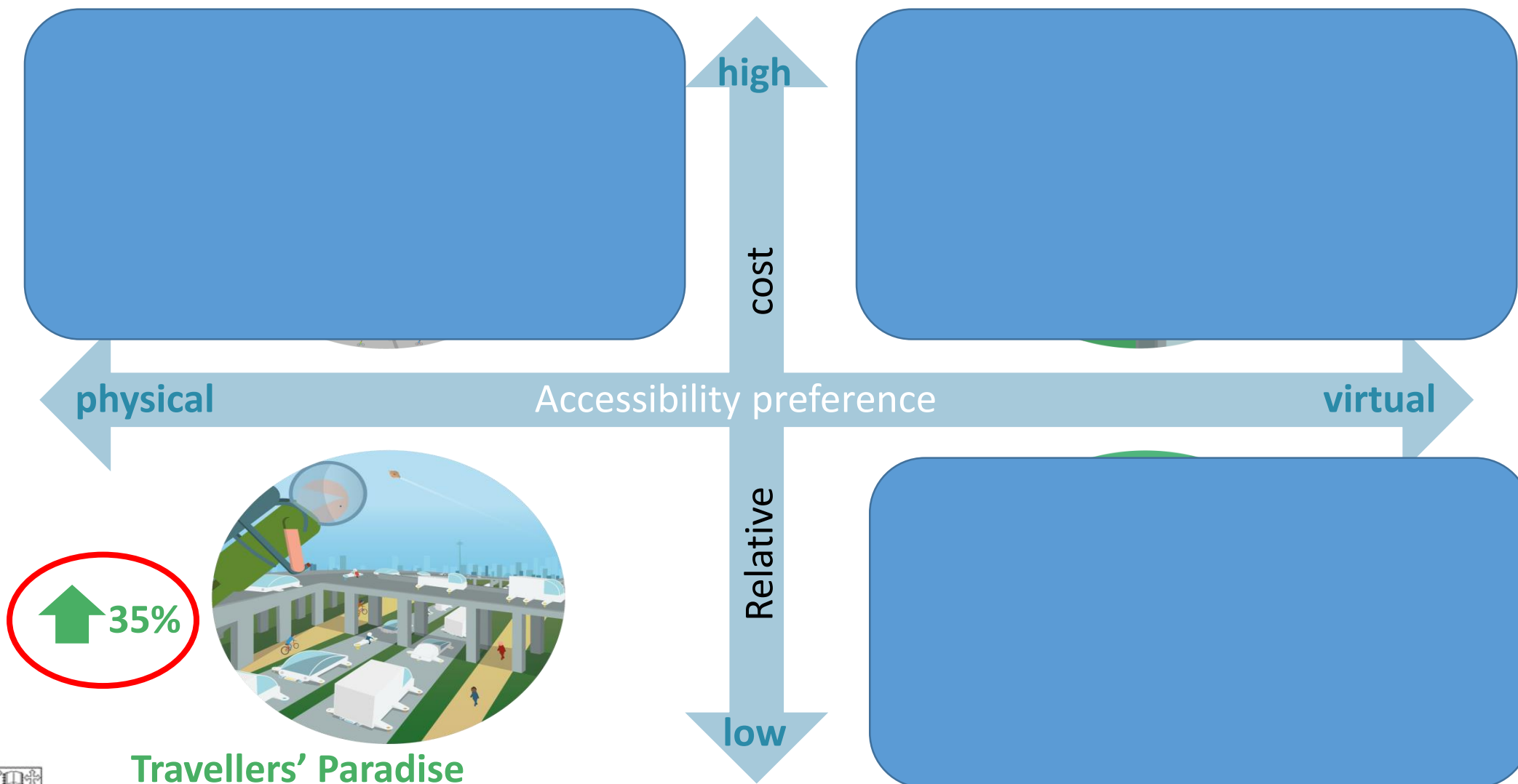
low



Percentage change in total vkt from 2014 to 2042



↕ Percentage change in total vkt from 2014 to 2042



Percentage change in total vkt from 2014 to 2042

Public Transport

Rapid

- High speed rail
 - Conventional
 - 200-300 km/h
- Maglev
 - Magnet levitation
 - 450km/h (600km/h)
- Hyperloop
 - Vacuum
 - 1200 km/h



Slower

Speed and capacity

Flexibility

- Bus



- Trolley bus (bus on overhead wire)

- Streetcar (single unit?)



- Tram (multiple units?)

- Light rail (modern tram without a step)

- Metro rail



Tracks

Slower

Trackless tram

- Flexibility and capacity?



Flexible



On-demand – e.g. Timaru

- <http://www.mywaybymetro.co.nz/>

Other transport



CORA

electronic Road User Charges (eRUC)

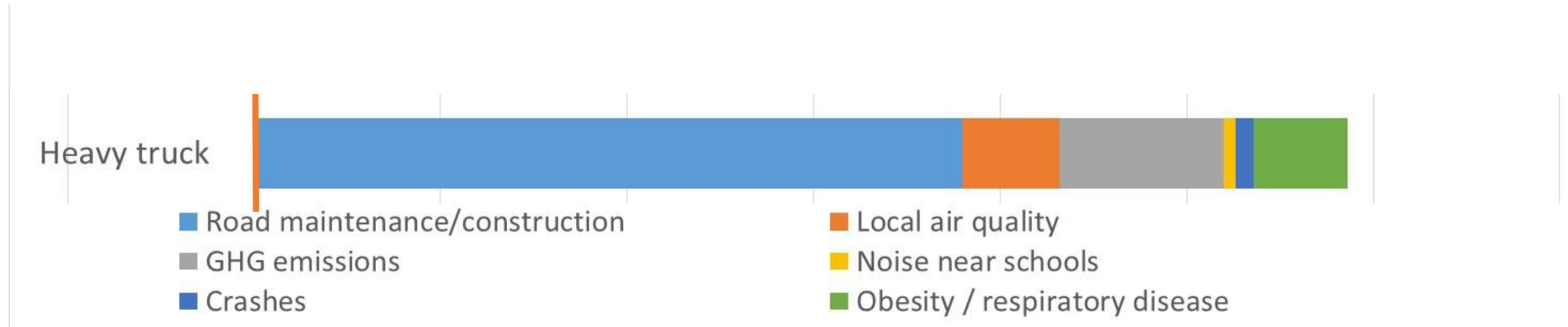
electronic Road User Charges (eRUC)

- Currently 50% fuel excise/ 50% RUC
- Distance
- Road Space?
- Fully charge?
- Manage demand?

Electronic Road User Charges

Cost per km

*Note: completely made up figures.
For illustrative purposes only.*



Electronic Road User Charges

Route A -100 kms



Route B
- 115 kms



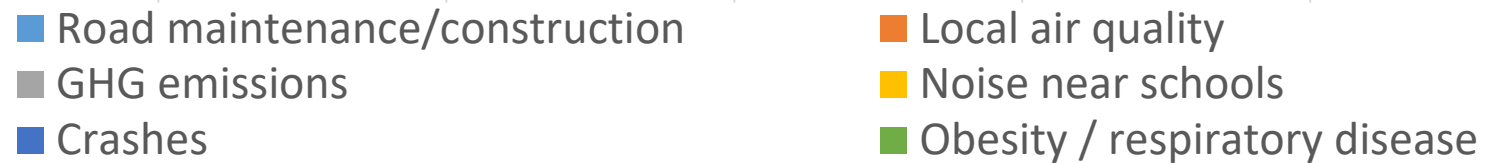
Electronic Road User Charges

Cost per km, by route

*Note: completely made up figures.
For illustrative purposes only.*



Route B



A future vision for NZ cities?

... and the role of transport

Freiburg, Germany



Freiburg, Germany

Freiburg, Germany



Vathorst, Netherlands





Groot Wezenland





If you plan cities for cars & traffic, you get cars & traffic. If you plan for people & places, you get people & places - Fred Kent

Thanks

Prof Simon Kingham

Tari Mātai Matawhenua | Dept of Geography

Te Whare Wānanga o Waitaha | University of Canterbury

simon.kingham@canterbury.ac.nz

Kaitohutohu Matua Pūtaiao | Chief Science Advisor

Te Manatū Waka | Ministry of Transport

s.kingham@transport.govt.nz